

# Emergency Events Associated with Illicit Methamphetamine Laboratories: An Emerging Public Health Threat

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## Introduction

Methamphetamine (meth), a powerfully addictive stimulant, can be easily manufactured in make-shift laboratories (labs) with substances that are readily available. Many of the substances used in illicit meth labs are hazardous and when mishandled, can lead to emergency events such as fires, explosions, spills, and toxic emissions. Meth-associated emergency events can cause serious injuries and death, not only to the meth "cookers," but to unsuspecting groups, such as members of the general public and first responders. National data from the Agency for Toxic Substances and Disease Registry's (ATSDR) Hazardous Substances Emergency Events Surveillance (HSEES) system were used to conduct a retrospective study on the acute public health consequences (i.e., morbidity, mortality, and evacuations) from emergency events associated with illicit meth labs.

## Methods

During the period 1996-2000, 15 state health departments participated in the active HSEES system collecting information (i.e., substance[s] released, victims, injuries, and evacuations) about hazardous substances events. An event was defined as any release(s) or threatened release(s) of at least one hazardous substance. A substance was considered hazardous if it might reasonably had been expected to cause an adverse human health effect. Various data sources used by states to collect event information included, but were not limited to, state environmental protection agencies, police and fire departments, hospitals, and local media. From 1996-1999, event data was entered by the states into a dBase format and uploaded into a central database for analysis. During 2000, ATSDR moved to a web-deployed data entry system.

## Results

See Tables 1-6

### Case Vignette

**Iowa.** In December 1999, an apartment unit caught fire as a couple were using ether and other volatile chemicals to manufacture meth while their two teenage daughters were sleeping in a nearby room. The parents and one daughter, aged 16, escaped the fire through the front door. The other daughter, aged 14, escaped by crawling through a broken window of a second floor apartment. The parents were transported to and treated at a hospital for chemical burns, but were not admitted. The 14 year old daughter was transported to and treated at a hospital for respiratory irritation and lacerations, but was not admitted. One hundred residents of the apartment building were evacuated for four hours.

### Discussion

- In the past decade, there has been a dramatic rise in the number of meth labs in the US (3).
- Why? Quick profits, readily available ingredients, easy recipes, and quick production time.
- Labs may be found in virtually any environment (i.e., homes, motels, and motor vehicles).
- Acute health effects from substances used in labs range from cough to death.
- Chronic health effects are unclear; however, substances used are known to be carcinogenic, mutagenic, and teratogenic in human and animal studies (4).
- Other meth lab dangers include booby traps, firearms, explosives, and guard dogs.

### Conclusion

Many meth events resulted in injured victims, deaths, evacuations, and decontaminations; however, increasing the awareness of the dangers of meth labs may lessen the overall morbidity and mortality.

Interventions and prevention activities being taken by some states include:

- Forming multi-agency clandestine drug lab response committees;
- Educating first responders about the hazards of meth labs;
- Passing state laws limiting the sale and distribution of meth precursor chemicals;
- Developing guidelines on how to respond to meth lab complaints;
- Adopting local regulations that focus on the health/safety hazards associated with meth labs;
- Altering the properties of anhydrous ammonia to render it useless for meth production;
- Having better security around commercial facilities that contain meth ingredients; and
- Tightening laws on meth crimes (i.e., making it a felony for stealing anhydrous ammonia).

### References

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Table 1: HSEES meth lab events, by state and year\*

HSEES State	1996	1997	1998	1999	2000	Total
Missouri	2	4	6	9	82	103
Washington	4	9	13	27	26	79
Iowa	0	0	8	11	33	52
Oregon	2	1	7	7	23	40
Wisconsin	0	0	0	0	8	8
Mississippi	0	0	0	0	7	7
Minnesota	0	0	0	2	4	6
Utah	0	0	0	0	1	1
<b>Total</b>	<b>8</b>	<b>14</b>	<b>34</b>	<b>56</b>	<b>184</b>	<b>296</b>

\* Other HSEES states without reported meth events were AL, CO, NJ, NY, NC, RI, and TX.

Table 2: Top 10 substances released at HSEES meth lab events

Rank	Substance name	No. of releases*	Health hazards	Appropriate personal protective equipment (PPE) (2)
1	Ammonia†	141	Toxic. Contact may cause severe injury, burns, or death.	Chemical protective clothing and SCBA‡
2	Ethyl ether (starter fluid)	52	Contact may cause burns to eyes and skin. Respiratory irritant.	Chemical cartridge respirator depending on concentration
3	Hydrochloric acid	39	Toxic. Contact may cause severe injury, burns, or death.	Chemical protective clothing and SCBA
4	Red phosphorus	34	Contact may cause burns to eyes and skin. Respiratory irritant.	Chemical protective clothing and SCBA
5	Ether NOS§	33	Irritant to eyes, skin, and respiratory system.	Chemical cartridge respirator depending on concentration
5	Ephedrine	33	Can cause side effects such as insomnia, restlessness, euphoria, palpitations, and high blood pressure when ingested.	Not applicable
6	Acid NOS	29	Toxic. Contact may cause severe injury, burns, or death.	Chemical protective clothing and SCBA
7	Iodine	27	Irritant to eyes, skin, and nose.	Chemical protective clothing and SCBA
8	Toluene	23	Toxic if inhaled or absorbed; irritant to skin, eyes, and lungs.	Chemical protective clothing and SCBA
9	Acetone	22	Contact may cause burns to eyes and skin. Respiratory irritant.	Chemical protective clothing and SCBA
10	Solvent NOS	18	Toxic. Contact may cause severe injury, burns, or death.	Chemical protective clothing and SCBA

\* The number of total releases (n=625) is greater than the number of events (n=296) because an event can have more than one release.

† Most of the ammonia releases recorded were anhydrous ammonia.

‡ Self contained breathing apparatus.

§ NOS = not otherwise specified.

Table 3: Comparison of public health consequences among total HSEES events versus meth-associated events, 1996-2000\*

Year	Total HSEES events, 1996-2000										HSEES Meth events, 1996-2000									
	Events		Events with victims		Events with deaths		Events with evacuations		Events with decons†		Events		Events with victims		Events with deaths		Events with evacuations		Events with decons†	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1996	5,486	17.8	390	7.1	20	0.4	443	8.1	370	6.7	8	2.7	4	50.0	0	0.0	1	12.5	3	37.5
1997	5,513	17.9	372	6.7	20	0.4	405	7.3	307	5.6	14	4.7	6	42.9	0	0.0	3	21.4	3	21.4
1998	5,981	19.4	405	6.8	24	0.4	461	7.7	326	5.4	34	11.5	16	47.1	2	5.9	12	35.3	13	38.2
1999	6,256	20.3	501	8.0	22	0.4	489	7.8	354	5.7	56	18.9	33	58.9	2	5.9	14	25.0	22	39.3
2000	7,551	24.5	760	10.1	27	0.4	472	6.3	443	5.9	184	62.2	105	57.1	1	0.5	21	11.4	42	22.8
<b>Total</b>	<b>30,787</b>	<b>100.0</b>	<b>2,428</b>	<b>7.9</b>	<b>113</b>	<b>0.4</b>	<b>2,270</b>	<b>7.4</b>	<b>1,800</b>	<b>5.8</b>	<b>296</b>	<b>100.0</b>	<b>164</b>	<b>55.4</b>	<b>5</b>	<b>1.7</b>	<b>51</b>	<b>17.2</b>	<b>83</b>	<b>28.0</b>

\* When this analysis was initially conducted, 1999 and 2000 data were considered preliminary.

† Decontaminations.

Table 4: Severity of disposition for victims injured at HSEES meth lab events

Severity of victim's disposition	Number	Percent
Transported to and treated at hospital, not admitted	139	39.9
Injuries experienced within 24 hours of event and reported by official	126	36.2
Transported to and treated at hospital, admitted	37	10.6
Treated on scene (first aid)	18	5.2
Seen by private physician within 24 hours	16	4.6
Death	7	2.0
Transported to hospital for observation, no treatment	4	1.1
Unknown	1	0.3
<b>Total</b>	<b>348</b>	<b>100.0</b>

Table 5: Types of victims injured at HSEES meth lab events

Population Group	Injured victims	
	Number	Percent
First responders*	200	57.5
General public†	122	35.1
Employees	25	7.2
Unknown	1	0.3
<b>Total</b>	<b>348</b>	<b>100.0</b>

\* Includes police, EMTs, firefighters, and hospital personnel.

† Includes "cookers."

Table 6: Types of injuries among victims at HSEES meth lab events

Injuries	Number	Percent


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